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REQUEST FOR PROPOSALFORDEVELOPMENT OF TRANSISTOR RADIO SET25 February 1952

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Request for Proposal

1. The aim of the project which the proposal is to cover has, for an ultimate aim, a Transistor Radio Set with the following characteristics:

- 1.1. Physical.-

- 1.1.1. Unitization - Either a single unit containing the receiver and transmitter or two separate units, one receiver unit and one transmitter unit.
- 1.1.2. Weight - The weight shall not exceed 2 1/2 pounds, exclusive of batteries.
- 1.1.3. Size - The overall cubage shall not exceed 46 cubic inches for either the single unit or dual units.
- 1.1.4. Form Factor - The form factor shall be such as to make for easy concealment of the unit in as compact a package as possible. All external corners shall be rounded to approximately 1/8 inch. All controls and plugs shall be flush with the case.

- 1.2. Mechanical.-

- 1.2.1. Construction - The construction of the set shall be such that operation of the set will not be impaired by nominal vibrations or physical shocks as would be encountered in normal shipment or under rough usage.

- 1.3. Electrical.-

- 1.3.1. Frequency Range - The sets shall cover the frequencies from 1.5 to 24 mc. by the use of four units.
 - 1.3.1.1. Unit "A" - 1.5 to 3 mc.
 - 1.3.1.2. Unit "B" - 3 to 6 mc.
 - 1.3.1.3. Unit "C" - 6 to 12 mc.
 - 1.3.1.4. Unit "D" - 12 to 24 mc.

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1.3.2. Power Sources - The sets shall be battery operated.
Battery drain shall be kept to an absolute minimum.

1.3.3. Receiver Circuitry.

1.3.3.1. Type of Reception - The sets shall be capable of receiving A-1 and A-3 type emissions.

1.3.3.2. Type of Circuit - The set shall use a superheterodyne circuit.

1.3.3.3. Type of Tuning - Optional

1.3.3.4. Sensitivity - The sensitivity shall be less than 15 microvolts to produce one-half milliwatt of audio output. The receiver shall not block at 10,000 microvolts input.

1.3.3.5. Image Rejection - The image rejection ratio shall not be less than 40 db.

1.3.3.6. Audio Response - The audio response shall be flat within 3 db. from 300 to 1000 cycles.

1.3.3.7. Dial Calibration - The dial calibration accuracy shall be 1% or better over the entire frequency range of the set.

1.3.3.8. Selectivity - The selectivity curve shall be symmetrical about the I.F. frequency. The curve shall have only one inflection point.

1.3.4. Transmitter Circuitry.

1.3.4.1. Power Output - The R.F. power output shall be maintained above 1 watt at all antenna impedances between 70 and 1200 ohms over all frequency ranges of the transmitters.

1.3.4.2. Oscillator - The oscillator shall be crystal controlled with provision for fundamental or harmonic operation. Operation on the crystal overmode shall not be possible.

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1.3.4.3. Antenna Load Impedance - The output circuit shall be such as to deliver maximum power into antenna impedances of 70, 150, 300, 600 and 1200 ohms at a phase angle of plus or minus 0 to 45 degrees.

1.3.4.4. Type of Emission - The transmitter to be capable of type A-1 emissions only.

1.3.4.5. Keying Characteristics - The unit shall be capable of being keyed up to 20 words per minute by means of a built-in key.

1.4. Operational Features.-

1.4.1. Temperature - The operational temperature range is contemplated to be from minus 40 degrees centigrade to plus 40 degrees centigrade. The design shall be such as to permit storage from minus 60 degrees centigrade to plus 60 degrees centigrade.

1.4.2. Break-In - Provision shall be made in the equipment to allow "Break-In" operation. This shall include provisions for the use of a single antenna for both transmitting and receiving.

1.4.3. Duty Cycle - The duty cycle shall be alternate 15 minute periods of the receiver and transmitter for 1 1/2 hours every four hours.

1.4.4. Indicators - Indicators shall provided to indicate resonance and R.F. power output in the transmitter.

2. The proposal covering the work of this project should provide answers to the following questions:

2.1. Can available types of transistors be used or must new types be developed?

2.2. Can the set be built using all transistors and no vacuum tubes?

2.2.1. Can the receiver be built using all transistors?

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- 2.2.2. Can the transmitter be built using all transistors?
- 2.3. Will it be practicable to build a composite tube/transistor receiver?
- 2.4. How much development time will be required to develop a radio set with these characteristics?
- 2.5. What would be the cost of a development program to develop a radio set with these characteristics?
- 2.6. When could a development program be started to develop such a radio set?
- 2.7. What stability could be expected of the VFO in the receiver?

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